

NON-PUBLIC?: N  
ACCESSION #: 8805310232  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Plant Vogtle - Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000424

TITLE: Manual Reactor Trip Due to Failure of Main Feed Isolation Valve  
EVENT DATE: 04/24/88 LER #: 88-013-00 REPORT DATE: 05/24/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: J. E. Swartzwelder, Nuclear Safety and Compliance Manager  
TELEPHONE #: 404-826-3618

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: SJ COMPONENT: SOL MANUFACTURER: S212  
REPORTABLE TO NPRDS: NO

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On April 24, 1988, at 0922 CDT, a manually initiated reactor trip occurred on Unit 1 with the reactor plant at approximately 100% of rated thermal power. The Loop 4 Main Feed Isolation Valve (MFIV) failed closed and would not respond to an open signal. Due to the steam flow - feedwater flow mismatch, the No. 4 Steam Generator (SG) water level was decreasing. The manual trip was initiated in anticipation of receiving a SG low level setpoint automatic reactor trip.

The direct cause of the event was that No. 4 MFIV failed closed. The most probable root cause is that an intermittent failure of an air solenoid valve coil led to the closure of No. 4 MFIV.

Corrective actions included replacing each component, which reasonably could have caused the valve to fail closed.

(End of Abstract)

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## A. REQUIREMENT FOR REPORT

This report is required per 10CFR50.73(a)(2)(iv), because there was a manual actuation of the Reactor Protection System.

## B. UNIT STATUS AT TIME OF EVENT

Unit 1 was in Mode 1 (Power Operation) with the reactor operating in a normal steady state condition at approximately 100% of rated thermal power. The reactor coolant system pressure and temperature were approximately 2240 psig and 588 degrees fahrenheit, respectively.

## C. DESCRIPTION OF EVENT

On April 24, 1988, at 0921 CDT, the Loop 4 Main Feed Isolation Valve (MFIV) Accumulator Gas Pressure Low Alarm was received. A few seconds later a Steam Feed Mismatch Alarm was received and loop 4 feedwater flow was observed as approximately one-half of the loop 4 steam flow. The loop 4 MFIV, 1-HV-5230, closed indication was observed and an attempt was made to reopen the valve from the control room. At 0922 CDT, the loop 4 MSIV had not responded to the open signal and Steam Generator (SG) #4 level had decreased from 52% to 42%. Because of the decreasing SG level, the Shift Supervisor ordered the Reactor Operator (RO) to manually trip the reactor. Following the reactor trip, the SG low level setpoints were reached initiating an expected Auxiliary Feedwater (AFW) actuation. At 0950 CDT, the reactor coolant temperature and pressure were stabilized at approximately 557 degrees fahrenheit and 2235 psig, respectively.

During the reactor trip recovery one (1) minor problem occurred. Main Feed Regulating Valve No. 2 did not indicate closed. A plant operator was dispatched to the valve and verified it was shut. A slight adjustment was made to the valve indication limit switch and the valve indication was functioning properly.

After the plant was stabilized, several unsuccessful attempts were made to open the Loop 4 MFIV. An Event Review Team (ERT) was established to investigate the event. The possible causes of the valve failure and the components which could have caused the valve to fail shut were identified. Troubleshooting activities were conducted under the direction of an Engineering Supervisor, but no reason for the malfunction was identified. At approximately 1800 CDT on April 24, 1988, the valve, 1-HV-5230, was satisfactorily opened. The valve remained opened for approximately 15 minutes and fast closed, without any personnel action. After further trouble-shooting failed to identify the problem, the valve was again opened satisfactorily. The valve failure did not

repeat itself and further troubleshooting failed to identify the cause of the valve malfunction. There are two (2) redundant control circuits (Trains A and B) for the MFIV and the valve failure could not be isolated to either individual circuit. At approximately 1000 CDT on April 25, 1988, the decision was made to replace the components in both control circuits, which could reasonably have caused the valve to fail closed. These components consisted of two (2) electrically operated air solenoids, four (4) electrical relays, and two (2) timer relays (agastats). The components were replaced prior to the restart of Unit 1.

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The removed parts were energized in the Maintenance Shop in a configuration which simulated the installation in the plant. All parts initially functioned as designed. After one intermittent failure, one of the air solenoids (1-HY-5230A) failed permanently. The solenoid coil resistance was found to be infinity.

#### D. CAUSE OF THE EVENT

The direct cause of this event was the closure of the No. 4 MFIV without personnel involvement. The parts removed from the MFIV were tested in the shop and the solenoid valve demonstrated an intermittent failure leading us to conclude that this was the cause of the event.

#### E. ANALYSIS OF EVENT

Accident analysis of a loss of normal feedwater indicate the auxiliary feedwater (AFW) system is capable of removing the stored and residual heat of the primary water system. Since the plant was manually tripped well before the steam generator heat transfer capability was reduced and the AFW system functioned properly, the primary system variables never approached a departure from nucleate boiling (DNB) condition. Therefore the plant safety and the health and safety of the public was not affected by this event.

#### F. CORRECTIVE ACTIONS

1. The components in both Trains (A&B) of the valve's control system circuitry, that could reasonably have caused the valve to fail closed, were replaced. This included a total of two (2) electrically operated air solenoids, four (4) electrical relays, and two (2) "Agastat" timer relays. This action was completed prior to the restart of Unit 1.

2. Since the specific cause of the event was not immediately known, instrument monitors were placed across the key components of the No. 4 MFIV control circuits, Trains A&B.

3. Engineering will evaluate the current design of the control circuit to determine if changes are needed. This is scheduled to be completed by 6-15-88.

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#### G. ADDITIONAL INFORMATION

##### 1. Failed Component Identification

Air Valve Solenoid - Skinner Electric Valve Division  
Part No. V5H65590

##### 2. Previous Similar Events

None

##### 3. Energy Industry Identification Systems Codes

Main Feed System - SJ  
Auxiliary Feedwater System - BA

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R. P. McDonald  
Executive Vice President  
Nuclear Operations

NON-00104

May 24, 1988

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk

Washington, D.C. 20555

PLANT VOGTLE - UNIT 1  
NRC DOCKET 50-424  
OPERATING LICENSE NPF-68  
LICENSEE EVENT REPORT  
MANUAL REACTOR TRIP DUE TO  
FAILURE OF MAIN FEED ISOLATION VALVE

Gentlemen:

In accordance with the requirements of 10 CFR 50.73, Georgia Power Company hereby submits a Licensee Event Report (LER) concerning a manual reactor trip that occurred when a main feedwater isolation valve failed closed.

Sincerely,  
/s/ R. P. McDonald  
R. P. McDonald

HC/dmh  
Enclosure: LER 50-424/1988-013  
c: (see next page)

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Georgia Power

U. S. Nuclear Regulatory Commission  
May 24, 1988  
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c: Georgia Power Company  
Mr. P. D. Rice  
Mr. G. Bockhold, Jr.  
Mr. M. Sheibani  
Mr. L. T. Gucwa  
GO-NORMS

U. S. Nuclear Regulatory Commission  
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Mr. J. F. Rogge, Senior Resident Inspector - Operations, Vogtle

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